

We Claim:

1. A device for effecting the photoelectric transport of charged materials in a liquid environment, comprising:

a substrate having a first face and a second face, the substrate capable of
5 generating a photocurrent;

a conductor contacting at least a portion of the first face of the substrate;

a permeation layer supported on the second face;

attachment entities coupled to the permeation layer;

a liquid in contact with the permeation layer;

10 an electrode in contact with the liquid; and

a light source disposed to illuminate at least a portion of the substrate, thereby
to induce a current within the device.

2. The device of claim 1, wherein the substrate is adapted to generate a photo-
current.

15 3. The device of claim 1, wherein the substrate is adapted to generate a photo
electrochemical current.

4. The device of claim 1, wherein the substrate is a semiconductor.

5. The device of claim 4, wherein the semiconductor is an n-type semiconductor.

6. The device of claim 4, wherein the semiconductor is silicon.

20 7. The device of claim 1, wherein the conductor contacting at least a portion of
the first face of the substrate is a film.

8. The device of claim 7, wherein the film is a copper film.

9. The device of claim 1, further comprising a chemical layer supported on the substrate.
10. The device of claim 9, wherein the chemical layer includes Mn_2O_3 .
11. The device of claim 10, further comprising a metal layer disposed between the
5 substrate and the chemical layer.
12. The device of claim 11, wherein the metal layer disposed between the substrate and the chemical layer is palladium.
13. The device of claim 1, comprising a containment structure disposed in fixed relation with the substrate.
- 10 14. The device of claim 13, wherein the containment structure includes a sheet-like containment system having an aperture through the sheet.
15. The device of claim 14, wherein the sheet is a Teflon sheet.
16. The device of claim 1, wherein the electrode is a ring electrode.
17. The device of claim 1, further comprising a reference electrode adapted to
15 contact the liquid environment in contact with the device.
18. The device of claim 1, further comprising an optical fiber disposed between the light source and the device.
19. The device of claim 18, wherein the optical fiber is a single mode optical fiber.
20. The device of claim 1, wherein the light source includes a laser.